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annual reports of the survey. The fossils of these beds (one of them, a turtle, from the hill in question) were sent Professor Cope, and are described by him in the fourth annual report of the survey. He says: "Its position is between the Loup Fork and *Equus* terranes. The fauna is intermediate and peculiar, as not a single species occurs in it which has been found in terranes prior or subsequent to it in time. The horizon is more nearly and strictly Pliocene than any of the lacustrine terranes hitherto found in the interior of the continent."

E. T. DUMBLE.

ON THE CLASSIFICATION OF SKULLS.

TO THE EDITOR OF SCIENCE: I learn from an article by Dr. Harrison Allen (SCIENCE April 5, 1895) that, in a paper entitled 'Observations on the Cranial Forms of the American Aborigines,' Proceedings of the Academy of Natural Sciences of Philadelphia, 1866, 232, J. Aitkin Meigs classified various types of crania, using nomenclature which in some part coincides with that proposed by me in my new 'Method of Classification of Skulls.'

I am very glad to learn that Meigs distinguished the various forms of human skulls as early as 1866, as I have done twenty-six years later. When two men, at so great a distance in time and space, have conceived a similar idea it is a strong argument that this idea is not a fantastic one.

I first tested my new method in the summer of 1891, examining a large collection of Malanesian skulls, and published my first memoir in the spring of 1892, which was translated into German (*Die Menschen Varietäten in Malanesian*. Archiv. für Anthropologie, XXI., 1892). In the same year, 1892, I had fortunately the opportunity of examining more than 2,200 skulls of the Mediterranean and Russian races, ancient and modern. I then systematized my classification, which was im-

perfect, and distinguished varieties and sub-varieties of human skulls in a systematic catalogue of ancient Russian skulls.

This method has the approval of many Italian anthropologists, a notable exception being Mantegazza, a strange type of man, and of some German anthropologists, as Ranke and Benedict. The French anthropologists are indifferent, but they find the method useful as an analysis of forms.

The memoir of Meigs is not known in Europe. The only work of this author that I possess is the Catalogue of the Specimens contained in the collection of the Academy of Natural Science of Philadelphia, 1857. In view of the notice published by Dr. Allen in SCIENCE, I am anxious to read the work referred to, and I should be much obliged if some American friend will procure a copy for me. I shall be glad to refer to the work of Meigs in a special note. G. SERGI.

UNIVERSITY OF ROME, April 23, 1895.

SCIENTIFIC LITERATURE.

The Geological and Natural History Survey of Minnesota, Volume III., Part I. Paleontology. 4to, 1895, Pp. lxxv., 474. Plates xxxiv.

Considerable activity has been manifested of late in a more careful and systematic study of the invertebrate faunas of the various geological horizons of this country, and several works upon the subject have already been published or are now under preparation. The value of a thorough examination and proper illustration of the faunas of many of our geological divisions will be very great to the stratigraphical geologist, for many problems are now obscure on account of the lack of knowledge of the very criteria most important for correlative purposes.

What is most required in this field is not so much the increase in number of species, although many horizons even in the eastern portion of the country have as yet been but

partially explored, as the thorough revision of the synonymy and geological distribution of the well-known forms described by the earlier paleontologists. At present the confusion is so great in many faunas that it becomes almost a hopeless task for the geologist to use the evidence with any hope of satisfactory results.

It is therefore very gratifying to find that the elaborate volumes upon the geology of Minnesota are to be accompanied by exhaustive reports upon the paleontology of the State. The first of these monographs, constituting Part 1., of Volume III., of the Final Reports, has just appeared and treats chiefly of the Lower Silurian faunas of the southeastern portion of the State.

The introductory chapter consists of an 'Historical sketch of investigation of the Lower Silurian in the Upper Mississippi Valley' and contains a chronological catalogue of the palæontological writings upon this subject, including lists of the species described.

Although the introduction deals only with the Lower Silurian, the first chapter is devoted to the Cretaceous fossil plants, a posthumous publication of Leo Lesquereux. Some twenty-eight species, six of them new, are described, the majority of the forms being also figured. More than half of the determinable species have been found in the States to the west, and the flora as a whole indicates the Dakota group as the geological horizon.

The second chapter deals with the microscopical fauna of the Cretaceous and is chiefly given up to a description of the Foraminifera, most of which are from boulder clay, although regarded as derived originally from the Cretaceous. Thirty species, representing eighteen genera, are determined. The authors are Woodward and Thomas.

The three remaining chapters of the volume are devoted to the fauna of the Lower Silurian, the third and fifth chapters

being by Winchell and Schuchert and dealing with the 'Sponges, Graptolites and Corals' and the 'Brachiopoda.' The authors follow Hinde in placing *Receptaculites* and *Ischadites* among the Hexactinellid sponges, and Ulrich in regarding *Cylindrocoelia* and *Heterospongia* as *Calcispongiæ*. If the latter reference should prove correct it is of interest as the earliest occurrence of representatives of that order. Among the corals a new genus, *Lichenaria*, regarded as related to *Columnaria*, but without septa, is established.

The rich Brachiopod fauna receives very exhaustive treatment, as might be anticipated from so thorough a student of the subject as Mr. Schuchert. Altogether eighty-two species with many varieties are recognized, of which several are new.

The longest chapter in the volume is that upon the Bryozoa by E. O. Ulrich. As a class the fossil Bryozoa are most difficult, and the different attempts at their systematic classification have not been attended hitherto with the most satisfactory results. To the author of the present chapter we are indebted more than to any one else for our knowledge of the Paleozoic representatives of this group. In the classification adopted, however, the reference of the Monticuliporoid forms to the Bryozoa is not in accordance with the more recent conclusions in this line.

The report as a whole is a most valuable contribution to the paleontology of the Upper Mississippi basin, and will supply a distinct want to the invertebrate palæontologist. The State Geologist is deserving of much credit for the admirable manner in which the volume has been brought out, and it is to be hoped that other State Surveys, which pay little attention to the paleontology of their States, may be induced to pursue the same course.

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